

What Is Claimed Is:

1. A data synchronization detection device

comprising:

means for holding a result of data identification of the code-modulated reproduced data;

means for detecting occurrence of a specified bit pattern in respect of the bit sequence resulting from data identification;

means for counting the number of occurrences of said specified bit pattern in an arbitrary bit period;

means for specifying partitions of code modulation of said reproduced data using the respective coefficient values of said pattern counting means in each bit period; and

means for shifting an input bit sequence by an arbitrary amount; wherein

the data identification result held by said means for holding is input to said means for shifting and said means for shifting outputs the data identification result at every partition of said code modulation, by bit shifting in accordance with said code-modulation partition information that has been determined by the means for specifying.

2. The data synchronization detection device

according to claim 1, further comprising:

means for effecting pattern comparison of the front section of the bit sequence of said data identification result with the PLO_SYNC pattern that effects reproduction of clock synchronization for data reproduction; and

means for specifying data range in the data identification result held in said means for holding from the output of the means for effecting and the output of said means for specifying partitions; wherein

said data are selectively output and input to said means for shifting in accordance with the information of said means for specifying data, from the data identification result held in said means for holding.

3. The data synchronization detection device according to claim 1, further comprising:

means for comparing pattern in respect of the rear section of the bit sequence of said data identification result with the GAP pattern that correctly reproduces the final bits of the data; and

means for specifying a data range in the data identification result held in said means for holding from the output of said means for comparing and the output of said means for specifying partitions; wherein

said data are selectively output and input to said means for shifting, from the data identification result held in said means for holding.

4. The data synchronization detection device
according to claim 1, further comprising:

means for comparing pattern, in respect of a data position detection pattern provided at an intermediate position of the data, of an intermediate portion of the bit sequence of the result of data identification and the data position detection pattern; and

means for specifying data range in the data identification result held in said means for holding from the output of said means for comparing pattern and the output of said means for specifying partitions; wherein

said data are selectively output and input to said means for shifting, in accordance with the information of said means for specifying data range, from the data identification result held in said means for holding.

5. The data synchronization detection device
according to claim 1, further comprising:

means for inputting a data quality signal that expresses the likelihood that there is an error in the identified output of the reproduced data, and that selects said data identification result used for data synchronization detection in accordance with this data quality signal.

6. The data synchronization detection device
according to claim 1, further comprising:

means for inputting a data quality signal that expresses the likelihood that there is an error in the identified output of the reproduced data, and that selects said data identification result used for data position identification in accordance with this data quality signal.

7. A signal processing device comprising:

means for applying a low-pass characteristic to an input analogue signal;

means for converting the analogue signal of the output of said means for applying into a digital signal;

means for equalizing the output of said means for converting;

means for identifying the data which was output by said means for equalizing; and

a data synchronization detection device according to claim 1 that synchronizes data detection using the identified bit sequence output from said means for inputting the output.

8. A data synchronization detection device comprising:

a memory that holds the result of data identification of code-modulated reproduced data;

a pattern comparison circuit that detects generation of a specified bit pattern in the bit sequence of the output of data identification;

a pattern counting circuit that counts the number of occurrences of said specified bit pattern in an arbitrary bit period;

a data phase determination circuit that specifies the code-modulation partition of said reproduced data by using the respective coefficient values of said pattern counting means in each bit period; and

a bit shift circuit that shifts the input bit sequence by an arbitrary amount; wherein

the data identification result held in said memory is input to said bit shift circuit and said bit shift circuit outputs a data identification result at each code modulation partition by shifting bit in accordance with the information regarding said code-modulation partition that was identified by said data phase identification circuit.

9. An information recording device comprising:

a data synchronization detection device according to claim 1;

means for decoding data in accordance with a specified code-modulation phase;

a plurality of means for descrambling code-demodulated data; and

means for detecting error on data respectively descrambled by said plurality of means for descrambling; wherein

the output data of said means for descrambling corresponding to the one in which the number of errors detected by said means for detecting error is a minimum is output as the reproduced data.

10. An information recording device comprising:

a data synchronization detection device according to claim 1;

means for code-demodulating data in accordance with a specified code-modulation phase;

means for detecting error on code-demodulated data;

and

means for descrambling error-corrected data; wherein reproduction data including scrambler information is input to said data synchronization detection device, and said means for descrambling descrambles using scrambler information in the reproduced data that has been error-corrected by said means for detecting error, and the output data of said means for descrambling is output as reproduced data.

11. An information recording device comprising:

a plurality of means for scrambling data that is recorded;

means for code-modulating data respectively scrambled by said means for scrambling;

means for counting the number of occurrences of a specified bit pattern in the bit sequence of this code-modulated data in an arbitrary bit period;

means for determining whether or not the position of the data code modulation codeword partition can be specified, by the count result of the number of occurrences of the specified bit pattern being a prescribed threshold value; and

means for selecting said means for scrambling that is used in accordance with the determination result of means for determining data phase; wherein

information is recorded constituting data that has been subjected to further code modulation by scrambling with said means for scrambling selected by said means for selecting.

12. The information recording device according to claim 11 wherein the information of said means for scrambling selected by said means for selecting is recorded.

13. An information recording medium on which are recorded:

a PLO_SYNC that reproduces the clock synchronization of reproduction of a data signal by pulling a PLL (Phase Locked Loop) in a sector in a unit memory region;

data constituting recording information;

ECC for error correction of this data; and

a GAP that reproduces the final bits of the information by identifying of said data; wherein

said PLO_SYNC and said data are recorded to be adjacent to each other.

14. The information recording medium according to claim 13, wherein a signal obtained by adding said PLO_SYNC and said GAP to the data signal constituting the recording information is recorded as a bundled sector.

15. The information recording medium according to claim 13, wherein a signal obtained by adding said PLO_SYNC and said GAP to the scrambling information when scrambling the recording information is recorded as a bundled sector.

16. An information recording format used in recording/reproduction of information comprising:

a PLO_SYNC pattern for reproducing the clock synchronization for data reproduction;

code-modulated data;

error correction information which corrects data error; and

a GAP pattern that correctly generates the final bits of the data; wherein

a bundle of information comprising said PLO_SYNC pattern, said data, said error correction information, and said GAP pattern constitutes one sector.

17. The information recording format according to claim 16, wherein data scrambling information is further included in said information constituting one sector.